No of Pages : 2 **Course Code : 12P702**

Roll No:
(To be filled in by the candidate)

PSG COLLEGE OF TECHNOLOGY, COIMBATORE - 641 004

SEMESTER EXAMINATIONS, OCTOBER / NOVEMBER - 2015

BE – PRODUCTION ENGINEERING Semester : 7

12P702 COMPUTER NUMERICAL CONTROL AND ROBOTICS

Time : 3 Hours **Maximum Marks : 100**

INSTRUCTIONS:
1. Answer **ALL** questions from GROUP – I.
2. Answer any **FIVE** questions from GROUP – II.
3. Answer any **ONE** question from GROUP – III.
4. Ignore the box titled as **"Answers for Group III"** in the Main Answer Book.

GROUP - I **Marks : 10 x 3 = 30**

1. How CNC turning centre is different from CNC lathe?
2. How right hand thumb rule is used to finalize CNC machine axis.
3. Draw the cross section of a LM guideway used in CNC machines.
4. What is meant by interpolation, which is used in CNC systems?
5. Brief the working of an encoder.
6. Brief how and where G41 and G42 are used in CNC vertical machining centre.
7. What is the purpose of PLC in CNC machines?
8. Differentiate flood and mist type of coolant systems.
9. How a link of a robot is defined?
10. Perform the transformation "Rot (y, -90)" on point (5, 3, 3).

GROUP - II **Marks : 5 x 10 = 50**

11. With neat sketches, explain the working of recirculating ball screw arrangement and how backlash is eliminated in the arrangement.
12. Draw necessary block diagrams and explain how input information is converted into a machine level language in a CNC machine control system.
13. Design a hydraulic circuit for the working of a hydraulic chuck used CNC lathe. Explain the working of the same with necessary cross sectional views.
14. Write an effective CNC part program for machining the component shown in Fig. 1. from a mild steel raw material of size Φ50 x 72 mm. Explain in brief the important functions used in the CNC codes.

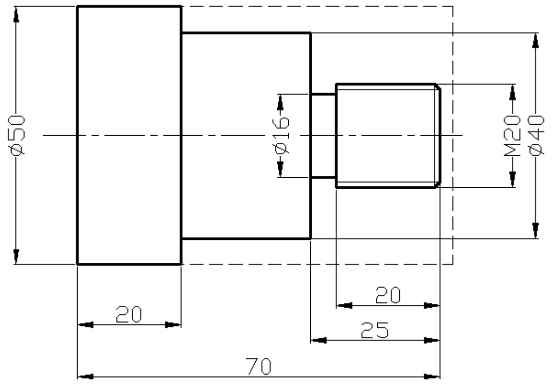


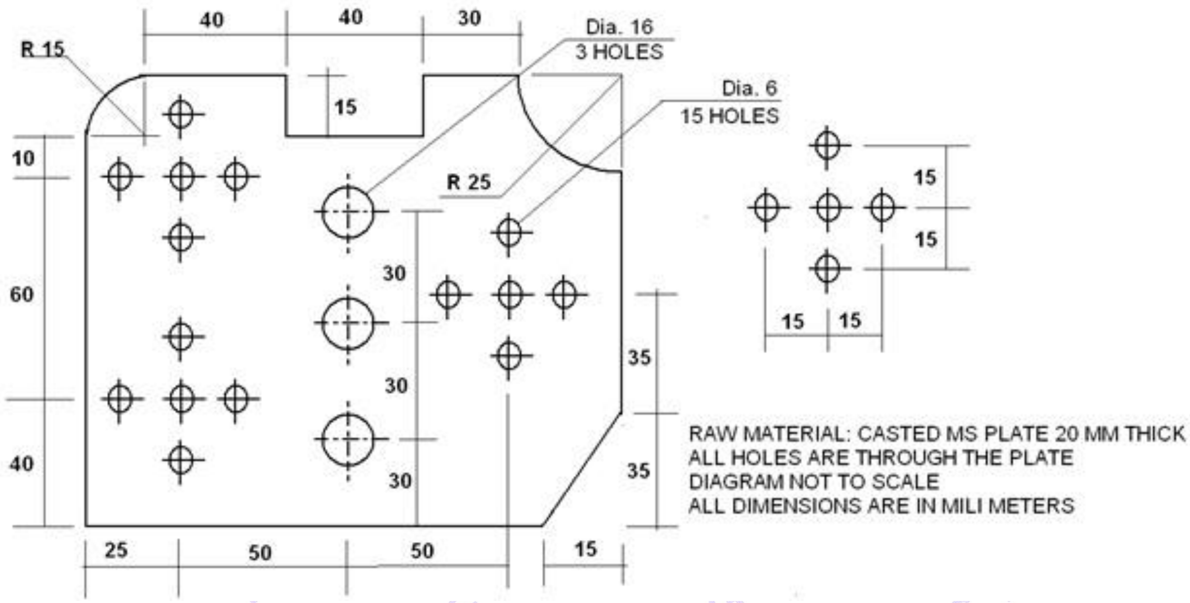
Fig. 1.

15. Draw a test chart used to perform the geometrical alignment test on a CNC lathe and explain the procedure to execute the same.

16. With neat sketches, explain the working of Harmonic Drive and Remote Centered Compliance (RCC) device.

GROUP - III **Marks : 1 x 20 = 20**

17. Fig.2 shows the final profile required to be finish-contoured and the holes to be drilled by using a CNC Vertical Machining Center. Write an efficient CNC part program for the same. Assume the finishing allowance of about 2 mm.



18. Write the classification of robots and explain the working of any one type demonstrating its features, specification, work envelop, manipulators, drives, etc.

/END/

FD/RL